

REMARKS

Claims 1-27 are pending in the application.

Claims 1-27 have been rejected.

Rejection of Claims under 35 U.S.C. §102(e)

Claims 1-5, 7, 9-11 and 13-27 stand rejected under 35 U.S.C. §102(e) as being anticipated by Kusters et al. (USPN 6,681,310) ("Kusters"). Applicants respectfully traverse this rejection.

With respect to claim 1, the cited art fails to teach or suggest:

identifying, based upon an intent associated with a logical volume, a first set of physical storage devices to reserve as backup for a second set of physical storage devices configured to provide the logical volume, wherein the second set of physical storage devices is configured using the intent associated with the logical volume, wherein the intent is obtained from a creator of the logical volume when the logical volume is being created and stored on the second set of physical storage devices, and wherein the intent comprises information identifying a set of characteristics specified by the creator of the logical volume, and

each physical storage device of the first set of physical storage devices and the second set of physical storage devices conforms to the intent.

In the initial rejection of the claim 1, the Examiner cited lines 26-29 of column 7 of Kusters as teaching "the second set of physical storage devices is configured using an intent associated with the logical volume." Office Action mailed Dec. 22, 2006, p. 2. The cited portion of Kusters recites: "using the underlying characteristics of the storage devices 106 to allocate mirror copies of a volume based on pairs of devices that have similar seek and data-rate characteristics."

Thus, the cited portion of Kusters describes selecting which devices to use to allocate mirror copies of a volume based upon "the underlying characteristics" of those devices. Kusters neither teaches nor suggests using information actually stored on the storage devices upon which the volume is implemented to make the selection. Furthermore, Kusters neither teaches nor suggests storing an intent that identifies characteristics specified by the creator of the volume. Finally, Kusters neither teaches

nor suggests using an intent such as the one described in claim 1 in the manner described in claim 1.

In response to the above arguments, the Examiner relies upon lines 14-52 of col. 7 and lines 60-63 of col. 6 of Kusters to allegedly teach: “the intent is stored on the second set of physical storage devices and wherein the intent comprises information identifying a set of characteristics specified by a creator [vendor] of the logical volume.” Final Office Action mailed June 13, 2007, p. 2. Thus, the Examiner equates the “vendor” in Kusters with the “creator of the logical volume” of claim 1.

As used in Kusters, the term “vendor” refers to the vendor that supplies a particular storage device or array. Kusters describes the difficulties that arise when different vendors’ storage devices each require different vendor-specific volume providers for configuration. See, e.g., Kusters, col. 2, lines 6-21. Thus, in Kusters, the term “vendor” refers to an entity that supplies a storage device and/or volume provider, not the creator of a logical volume. Stated another way, in Kusters, a vendor provides a storage device and a volume provider that can be used to configure the storage device. However, the vendor does not specify characteristics of a logical volume or otherwise act as the “creator” of a logical volume; instead, the vendor simply provides a storage device and a tool (the volume provider) that can be used to create a logical volume using the storage device.

Furthermore, nothing in the cited portions of Kusters teaches or suggests an “intent” that is “obtained from a creator of the logical volume when the logical volume is being created” and “stored on the second set of physical storage devices.” The Examiner states that the “volume providers are stored on the storage devices” and equates these volume providers with the intent of claim 1. Final Office Action, p. 2. However, in Kusters, the volume providers are applications that execute in user space and/or kernel space. Kusters, col. 7, lines 7-12 and FIG. 3. While such a volume provider can “reside” on a storage device (Kusters, col. 6, lines 61-62), such an application is clearly not obtained from a creator of the logical volume when the logical volume is being created. Instead, such an application must necessarily already be executing in order for a volume to be created on the underlying storage device. Furthermore, other portions of Kusters (e.g., cols. 2 and 6) suggest that the volume providers are vendor-specific tools provided by a storage device vendor, and thus these volume providers are clearly not “obtained from a creator of the logical volume when the logical volume is created.”

Additionally, the cited portions of Kusters do not teach or suggest that the “volume providers” are intents that include “information identifying a set of characteristics specified by the creator of the logical volume.” The cited portion of Kusters states that: “Volume providers 203 may include vendor-specific [sic] rules.” Kusters, col. 7, lines 45-46. However, these vendor-specific rules do not identify a set of characteristics that were specified by the creator of a logical volume. Instead, these rules are rules that were specified by a vendor for use in configuring volumes on an underlying storage device. As noted above, a vendor (as used in Kusters) is clearly not the same as the creator of a logical volume.

The Applicants also note that the rejection set forth in the Final Office Action is inconsistent. As noted above, the Examiner equates the “volume providers” described in Kusters with the “intent” of claim 1. Final Office Action, p. 2. However, the Examiner also equates the “storage characteristics, seek and data-rate characteristics” described in Kusters with the intent of claim 1 on the same page of the Final Office Action. The Applicants note that this application of Kusters to claim 1 is inconsistent in that the Examiner is equating the “intent” of claim 1 with two unrelated things: a volume provider, which is an application that executes in user or kernel space, and characteristics, which are used by a volume manager that controls the volume providers. Neither of these things is the same as the intent of claim 1, nor is there any teaching or suggestion that these two unrelated things could be combined to somehow produce the intent of claim 1. This inconsistency further emphasizes that the cited portions of Kusters fail to teach or suggest claim 1.

In the present Office Action, mailed November 15, 2007, the Examiner states that the above arguments are “moot in view of the new ground(s) of rejection.” Office Action, p. 6. However, the Examiner continues to rely upon the same portions of Kusters described above in rejecting the claims, with minor changes in which elements of Kusters are equated with the elements of claim 1. Accordingly, the above arguments have been represented, since they provide context and explain the teachings of the cited portions of Kusters.

Now, the Examiner equates “characteristic [sic] such as, mirroring/stripping etc corresponding to the storage device associated with the logical volume” with the “intent” of claim 1. Office Action, p. 3. Furthermore, the Examiner now equates the “volume

provider" with the "creator of the logical volume" of claim 1. This interpretation of Kusters still fails to anticipate, teach, or suggest claim 1.

Claim 1 recites the act of identifying a first set of physical storage devices to reserve as backup for a second set of physical storage devices. Nothing in Kusters teaches or suggests such an act. In other words, nothing in Kusters teaches or suggests identifying physical storage devices to be reserved as a backup for another set of physical storage devices. Applicants further note that the only discussion of any type of reservation in Kusters is in the Copyright Notice/Permission section of Kusters, which is completely unrelated to claim 1.

Furthermore, claim 1 states that the intent is obtained from a creator of the logical volume when the logical volume is being created and that the intent is stored on the second set of physical storage devices, which is configured to provide the logical volume. None of the characteristics described by the Examiner in the current Office Action appear to be stored on a set of physical storage devices that implement a volume associated with the characteristics.

While the Examiner cites col. 6, lines 57-62 of Kusters as teaching this feature, this section of Kusters appears to only teach that "volume providers... may reside within the respective storage devices." Earlier, the Examiner states that "the volume providers contain the intent information" (Office Action, p. 3). Accordingly, the Examiner's argument appears to be that the volume providers "contain" the characteristics, and that the volume providers can be stored on storage devices.

However, no portion of Kusters teaches or suggests that the characteristics corresponding to a particular logical volume are stored on the physical storage devices configured to implement that volume. While volume providers may be stored on storage devices, nothing in the cited portion of Kusters teaches or suggests that the volume provider that creates a particular volume is stored on the same physical storage devices that implement that particular volume.

Furthermore, Applicants are unable to find support for the position that the "characteristics" are contained in the volume providers and thus stored on the storage devices. The Examiner appears to be citing lines 42-52 of column 7 of Kusters as teaching this, but the cited portion of Kusters merely teaches that the volume providers "may include vendorspecific [sic] rules to optimize binding configurations, monitor and dynamically tune performance, automatically handle faults, or any other vendor-specific

added functionality. In addition, volume providers 203 expose configuration data that identifies the physical resources comprising the logical volumes.” This portion of Kusters clearly neither teaches nor suggests that the volume providers contain characteristics of a particular volume; instead, it just states that the volume providers can include rules, provided by a vendor, for performing various functions and that the volume providers have functionality to “expose” configuration data. Applicants note that exposing configuration data is not the same as containing it, since merely providing an interface to configuration data would provide exposure. Nothing in Kusters teaches or suggests that the volume providers actually contain such configuration data. Additionally, nothing in Kusters teaches or suggests that such configuration data includes the characteristics that are being equated with the intent of claim 1. Instead, the configuration data appears to be data usable to map a volume to a physical resource.

Even if Kuster’s volume providers did “contain” the “characteristics,” Kusters still fails to teach or suggest the specific features of claim 1. In particular, the mere fact that a volume provider can be stored on a storage device neither teaches nor suggests that the volume provider that created one particular volume be stored on the same physical storage device as that one particular volume.

For at least the foregoing reasons, claim 1 is patentable over the cited art, as are dependent claims 2-5, 7, 9-11, and 13-15. Claims 16-27 are patentable over the cited art for similar reasons.

Rejection of Claims under 35 U.S.C. §103(a)

Claims 8 and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kusters et al. in view of Cabrera et al. (USPN 6,904,599) (“Cabrera”). Applicants respectfully traverse this rejection for at least the foregoing reasons set forth above.

Claim 6

Applicants respectfully note that, while claim 6 is indicated as being rejected on the first page of the current Office Action, no particular ground of rejection of this claim has been cited for this claim. Accordingly, Applicants respectfully submit that this claim is allowable.

CONCLUSION

In view of the amendments and remarks set forth herein, the application and the claims therein are believed to be in condition for allowance without any further examination and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephone interview, the Examiner is invited to telephone the undersigned at 512-439-5087.

If any extensions of time under 37 C.F.R. § 1.136(a) are required in order for this submission to be considered timely, Applicant hereby petitions for such extensions. Applicant also hereby authorizes that any fees due for such extensions or any other fee associated with this submission, as specified in 37 C.F.R. § 1.16 or § 1.17, be charged to deposit account 502306.

Respectfully submitted,



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